LTD Heater

MODEL # LTD - 18

Owner's Manual

MANUAL # PNEG-595

AIRSTREAM
a division of
THE GSI GROUP

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LTD HEATER CHECK LIST

✓OK

_____ 1. All wire connections

_____ 2. Electrical connection visual inspection and fastener tightness

_____ 3. Spark plug gap .125

_____ 4. Pipe train tightness and gas leaks

_____ 5. Flame sensor tight

_____ 6. Fuse in place, extra fuse provided

_____ 7. Time delay reset

_____ 8. Indicator light

_____ 9. Pressure gauge

_____ 10. Regulator adjusted

_____ 11. Shut off valve operates correctly

_____ 12. Vapor high limit

_____ 13. Unit cycles on to off

_____ 14. Heat rise even across transition

_____ 15. Unit cycles hi to lo (hi-lo only)

_____ 16. Mod valve holds temperature within 1 degree (mod units only).

_____ 17. All decals and serial number tag

_____ 18. Aesthetic appearance

_____ 19. Manual

Tester Signature_____

Date_____

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ROOF WARNING, OPERATION & SAFETY

ROOF DAMAGE WARNING AND DISCLAIMER

CAUTION!
Excessive vacuum (or pressure) may damage roof. Use positive aeration system. Make sure all roof vents are open and unobstructed. Start roof fans when supply fans are started. Do not operate when conditions exist that may cause roof vent icing.
DC-969

GSI DOES NOT WARRANT ANY ROOF DAMAGE CAUSED BY EXCESSIVE VACUUM OR INTERNAL PRESSURE FROM FANS OR OTHER AIR MOVING SYSTEMS. ADEQUATE VENTILATION AND/OR "MAKEUP AIR" DEVICES SHOULD BE PROVIDED FOR ALL POWERED AIR HANDLING SYSTEMS. GSI DOES NOT RECOMMEND THE USE OF DOWNWARD FLOW SYSTEMS (SUCTION). SEVERE ROOF DAMAGE CAN RESULT FROM ANY BLOCKAGE OF AIR PASSAGES. RUNNING FANS DURING HIGH HUMIDITY/COLD WEATHER CONDITIONS CAN CAUSE AIR EXHAUST OR INTAKE PORTS TO FREEZE.

HEATER OPERATION

Thank you for choosing a GSI/Airstream product. It is designed to give excellent performance and service for many years.

This manual describes the operation of the GSI/Airstream LTD Heater. Many models are available to accommodate low, medium or high temperature grain conditioning.

The principal concern of The GSI Group, Inc. ("GSI") is your safety and the safety of others associated with grain handling equipment. This manual is written to help you understand safe operating procedures, and some of the problems that may be encountered by the operator or other personnel.

As owner and/or operator, it is your responsibility to know what requirements, hazards and precautions exist, and to inform all personnel associated with the equipment, or who are in the heater area. Avoid any alterations to the equipment. Such alterations may produce a very dangerous situation, where serious injury or death may occur.

SAFETY ALERT SYMBOL

The symbol shown is used to call your attention to instructions concerning your personal safety. Watch for this symbol; it points out important safety precautions. It means "ATTENTION", "WARNING", "CAUTION", and "DANGER". Read the message and be cautious to the possibility of personal injury or death.

WARNING! BE ALERT!

Personnel operating or working around electric fans should read this manual. This manual must be delivered with the equipment to its owner. Failure to read this manual and its safety instructions is a misuse of the equipment.

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SAFETY ALERT DECALS

The GSI Group, Inc. recommends contacting your local power company, and having a representative survey your installation so the wiring is compatible with their system, and adequate power is supplied to your unit.

Safety decals should be read and understood by all people in the grain handling area. The rotating blade, fire warning decals and voltage danger decal must be displayed on the fan/heater can. The danger decal, DC-552, should be present on the inside bin door cover of the two ring door, 24" porthole door cover and the roof manway cover.

If a decal is damaged or is missing contact:

The GSI Group, Inc.
1004 E. Illinois St.
Assumption, IL 62510
217-226-4421

A free replacement will be sent to you.

WARNING
Stay clear of rotating blade. Blade could start automatically. Can cause serious injury. Disconnect power before servicing.
DC-1225

WARNING
Flame and pressure beyond door. Do not operate with service door removed. Keep head and hands clear. Can cause serious injury.
DC-1227

DANGER
Rotating flighting can kill or dismember.
Flowing material can trap and suffocate.
Crusted material can collapse and suffocate.
Keep clear of all augers.
DO NOT ENTER this bin!
If you must enter this bin:
1. Shut off and lock out all power.
2. Use safety harness and safety line.
3. Station another person outside the bin.
4. Avoid the center of the bin.
5. Wear proper breathing equipment or respirator.
Failure to heed these warnings will result in serious injury or death.
DC-552

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LTD HEATER INSTALLATION

FUEL CONNECTION

Important! Do not use propane tanks which have previously been used for ammonia unless they have been purged according to procedures of the National L. P. Association.

Be sure fuel supply system complies with all local codes for L. P. gas installations.

PROPANE VAPOR MODELS

1. Propane vapor models are designed to run directly off of supply tank or from a separate external vaporizer.

2. Run proper size line (see specifications) to pipe train on heater. Have a qualified gas service person inspect installation to be sure everything is installed according to local codes and ordinances.

3. After installation is complete check all connections for leaks. DO NOT USE FLAME FOR LEAK TESTING. (See above for other precautions.)

NATURAL GAS MODELS

1. Natural gas models are similar to vapor models, but have a larger orifice to accommodate lower pressure sometimes found with natural gas.

2. Run proper size line (see specifications) to pipe train on heater. Have a qualified gas service man inspect installation to be sure everything is installed according to local codes and ordinances.

3. After installation is complete check all connections for leaks. DO NOT USE FLAME FOR LEAK TESTING. (See above for other precautions.)

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INSTALLING THE LTD HEATER WITH LTD MOUNTING BRACKETS

THESE INSTRUCTIONS ARE FOR HEATER INSTALLATION ON FAN UNITS WITH 230V MOTORS.

BE SURE POWER IS DISCONNECTED AND LOCKED OUT BEFORE INSTALLATION! FAILURE TO DO SO MAY CAUSE SERIOUS INJURY OR DEATH.

1. Place heater on the ground next to the inlet of the centrifugal fan. The LTD heater is designed to mount upwind. Be sure airflow decal is pointing towards the inlet of the fan.

2. Bolt LTD mounting brackets to each of the six holes in the downstream angle ring of the heater. Snug tighten bolts such that they can still pivot with little force applied. See chart for slots to bolt through in bracket.

Slot	Fan Inlet Bolt Circle
End	31" to 35"
Middle	Less than 31"

3. Pivot brackets so they are nearly radial from center of heater. Stand behind heater and deter mine which bolts on fan inlet best line up with the brackets. Remove the nuts from those six(6) bolts and bolt the remaining six(6) brackets to fan using nuts removed. It may be necessary to remount the fan grill guard so mounting brackets will seat properly. Slots to use for fan mounting bolts are below.

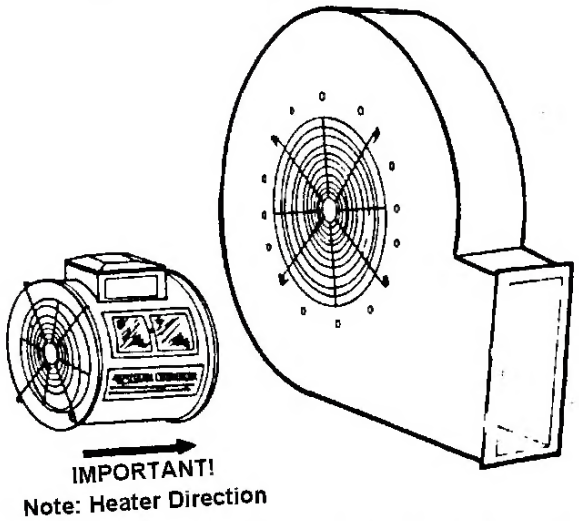

Figure 1: Make sure the LTD Heater is positioned in the right direction.

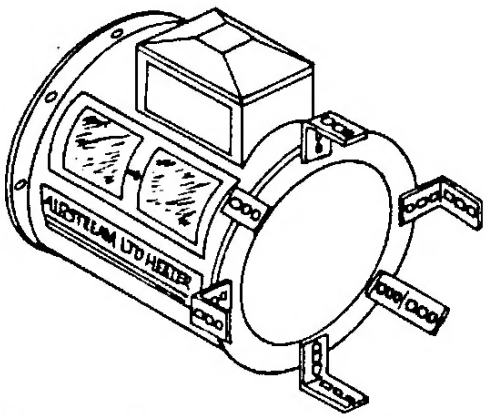

Figure 2: The six(6) mounting brackets positioned on the LTD Heater.

Slot	Fan Inlet Bolt Circle
End	35"
Middle	31 3/4"
Inner	29"

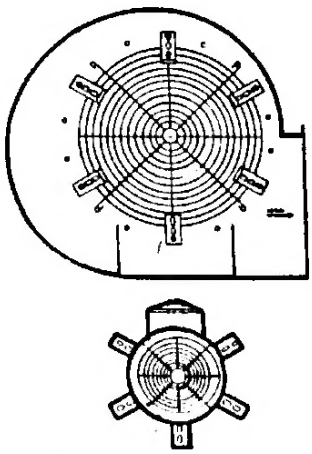

Figure 3: The LTD Heater brackets pivoted so they are radial from the center of the heater.

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4. Lift heater and align paired brackets as shown and insert bolts in corresponding slots as in table below. Be sure to place washer provided between tap and bracket. Tighten bolts snug but loose enough to slide heater in and out.

	Slot	
Fan HP	**Heater**	**Fan**
5	Middle	Middle
7.5	End	Middle
10	End	Middle
15	End	End
20	End	End
25	End	End

5. Align mating bracket pairs so that they are in a straight line. Tighten bolts on fan and heater rigid.

6. Make sure the heater stand off dimension is correct for the fan used. Refer to the table below. Slide the heater to meet the stand off dimension all around. Tighten mating brackets rigid. The heater should now be securely fastened to the fan. If not tighten all loose connections.

Fan HP	Stand Off
5	5"
7.5	7"
10	7"
15	7 1/2"
20	8 1/2"
25	8 1/2"

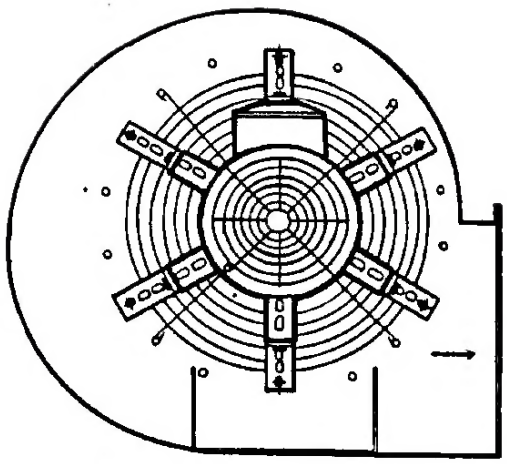

Figure 4: Heater aligned with paired brackets and bolts inserted.

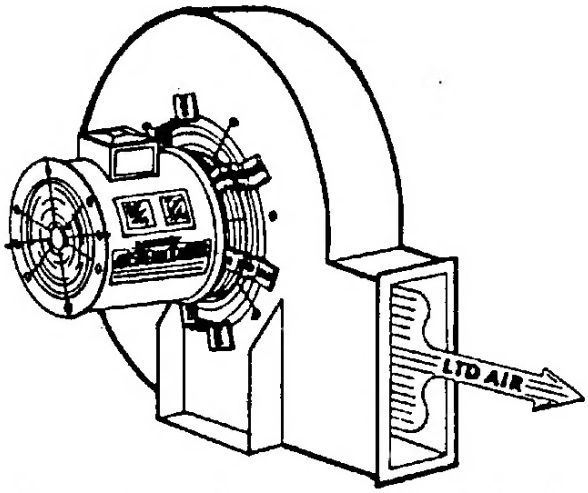

Figure 5: Align mating bracket pairs in a straight line.

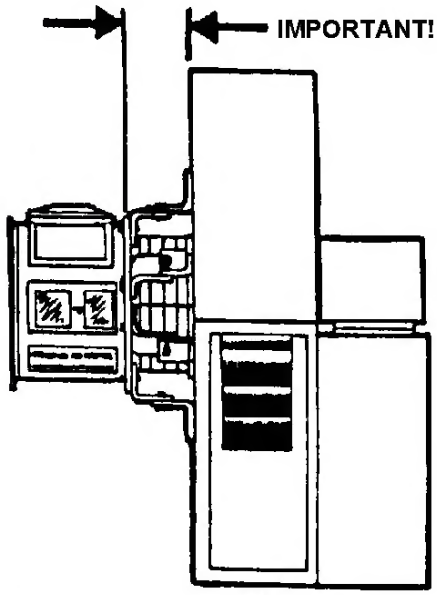

Figure 6: Check the heater stand off distance, based on fan horsepower.

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LTD HEATER INSTALLATION

Note: The optimum distance the heater should stand away from the fan inlet has been experimently determined. If there are any ignition problems, or flame quality is not as desired, move heater in or out, calibrating heater to actual field conditions. Variation from table may be required to adjust for grain depth, fan performance and bin size.

8. The LTD stand off bracket can increase the efficiency of the fan and heater dramatically compared to using an upwind mounting plate. Moreover, by applying the heat to the air upwind, the air will be a constant temperature discharging into the plenum resulting in more uniform drying.

9. After heater is securely mounted, connect gas lines as required per the installation requirements.

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LTD HEATER ELECTRICAL INSTALLATION (230V FANS)

1 Connect power cord to fan control box

2 Make field connections of wires in fan box as shown in Figure 1

IMPORTANT! HEATER MUST BE INTERLOCKED WITH FAN FOR SAFE OPERATION.

3 Connect deluxe thermostat control (optional) in heater box as shown in Figure 1. IMPORTANT! THERMOSTAT MUST BE INSTALLED FOR SAFE OPERATION.

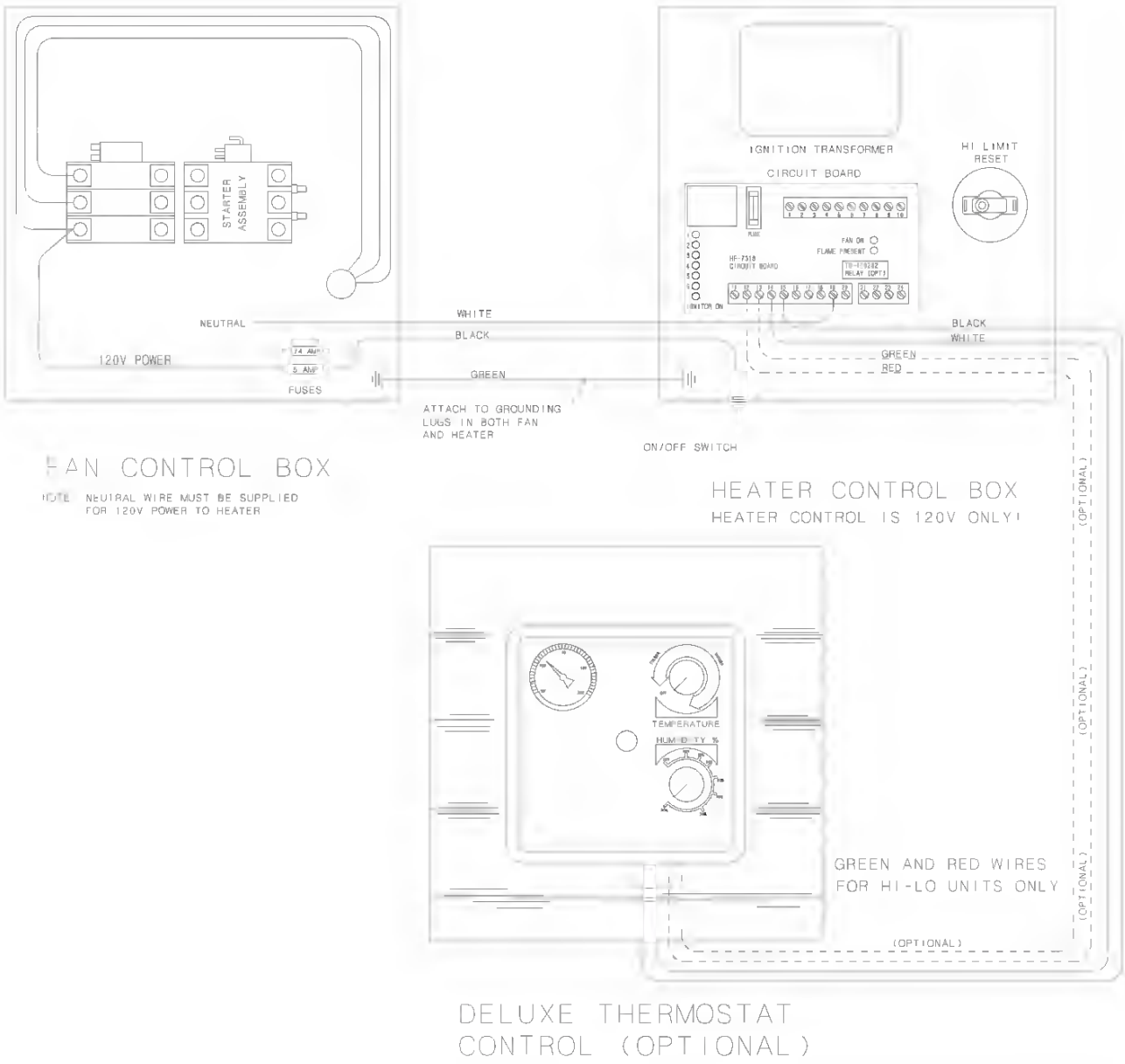

Figure 7: 230 volt fan control box.

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LTD HEATER ELECTRICAL INSTALLATION (460V FANS)

1. Connect power cord to fan control box.

2. Make field connections of wires in fan box as shown in Figure 2. 110V power supply or 5KVA 460V to 110V transformer must be used to supply power for heater. IMPORTANT! HEATER MUST BE INTERLOCKED WITH FAN FOR SAFE OPERATION.

3. Connect deluxe thermostat control (optional) as shown in Figure 2. IMPORTANT! THERMOSTAT MUST BE INSTALLED FOR SAFE OPERATION.

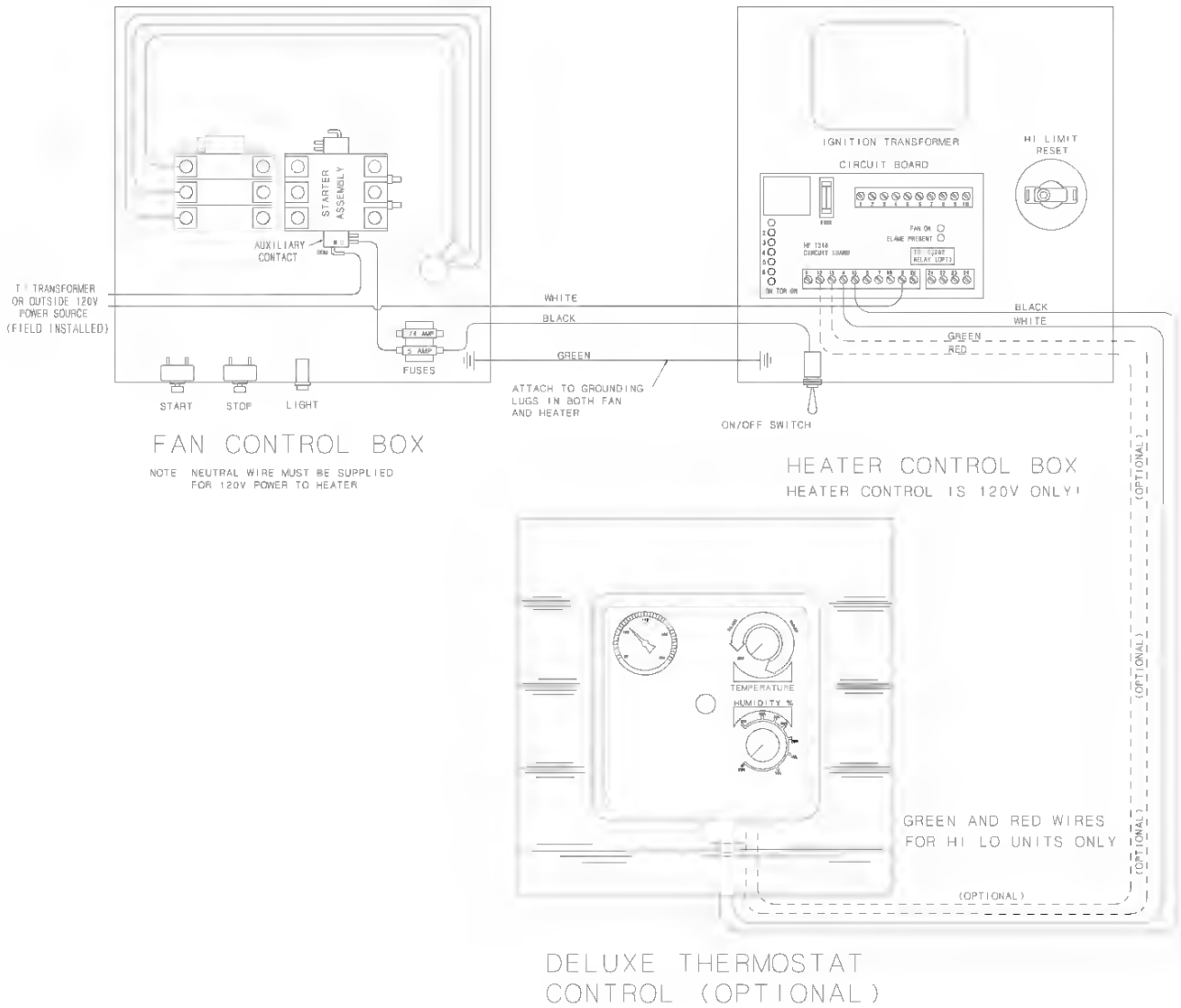

Figure 8: 460 volt fan control box.

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AIRSTREAM SURFACE MOUNT HUMIDISTAT (EDS SYSTEMS ONLY)

1 The humidistat can be used to directly control the operation of a heater for drying, or with additional equipment, the operation of a fan for aeration.

2 The humidistat closes on a humidity rise. If the humidistat is set at 50% relative humidity and the humidity of the air surrounding the sensing unit on the humidistat is greater than 50% relative humidity, the microswitch remains closed. When the humidity drops below 50% relative humidity the microswitch opens. Power then ceases to travel through the humidistat, simultaneously shutting off the heater. If the humidistat is used as an aeration control or fan control for natural air drying, additional equipment is required to control the fan power supply, so it runs when the humidistat is open.

3 The housing of the humidistat has a perforated bottom allowing air to surround the sensing element. The perforated bottom insures accurate sensing of the (outside) humidity. The housing also incorporates a vent hole at the top of one side. This guards against heat build up in the box, changing the relative humidity and destroying the heat sensing ability of the unit. Also, air is drawn through the perforated bottom and across the sensing element of the humidistat. These design features insure accurate sensing of relative humidity.

4 The humidistat should be mounted with the back plate, corner holes on a corrugation hill. It should be positioned approximately three feet from the ground or grade line as shown in the illustration.

5 The humidistat is used in conjunction with a temperature sensing control device (thermostat), which senses the drying air temperature. If the plenum air temperature exceeds the setting of the thermostat, the thermostat opens and the heater shuts off. When the plenum temperature drops below the setting of the thermostat, the thermostat closes and the heater turns on again. The thermostat is a safety device keeping the grain temperature equal to the thermostat setting. Some grains are more sensitive to temperature. Quality, germination and value are lost due to high temperatures. Grains used for seed, rice and popcorn are adversely effected by high temperatures.

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LTD HEATER INSTALLATION

SURFACE MOUNT HUMIDISTAT (AS A HEATER CONTROL)

REDRAW

BOTH HUMIDISTAT AND THERMOSTAT MUST BE CLOSED FOR HEATER OPERATION

REDRAW

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LOW TEMPERATURE HEATER SPECIFICATIONS

		18"
All models	Inside diameter	18 5/16"
	Bolt circle diameter	19 7/16"
	Length	22"
	BTU rating	400000
	Weight	81
Vapor models	Maximum fuel flow (GPH)	167
	Orifice	5/64"
	Modulating valve bypass orifice	Red
	Minimum operating pressure	2
	Maximum operating pressure	20
	Minimum line size	3/8"
Natural gas models	Maximum fuel flow (CFH)	421
	Orifice	9/64"
	Modulating valve bypass orifice	Yellow
	Minimum operating pressure	1
	Maximum operating pressure	7
	Minimum line size	1/2"

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LTD HEATER OPERATION

1. Check to see if high limit control is in the down position
2. Open fuel valves between tank and heater
3. Turn the heater power switch to ON by toggling the ON/OFF switch to ON position
4. For prolonged shutdown close the tank or supply valve and allow flame to burn until all the gas is out of the line (the flame dies out)
5. If any problems occur refer to the service section of this manual and follow the procedure described. Some common problems are
   a. Humidistat and /or thermostat is not set high enough
   b. Pressure regulator is not open
   c. Supply valve is not open
   d. High limit button is not pushed in

BTU'S PER GAUGE PRESSURE (PSI) PROPANE MODELS (APPROXIMATE)

LOW TEMPERATURE

	Operating Pressure (PSI)									
Diameter	**2**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**
18"	102900	145970	181870	208190	234510	253660	275200	294340	311090	335020

BTU'S PER GAUGE PRESSURE (PSI) NATURAL GAS MODELS (APPROXIMATE)

LOW TEMPERATURE

	Operating Pressure (PSI)						
Diameter	**1**	**2**	**3**	**4**	**5**	**6**	**7**
18"	144100	205200	250800	289100	322850	353860	383040

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MODULATING VALVE OPERATION

Your LTD heater is equipped with a modulating valve. The following material should be read thoroughly.

1 The modulating valve regulates gas flow through heater based on sensing unit in the plenum, and maintains a constant drying air temperature.

2 The sensing bulb of the modulating valve should be mounted through the bin wall with the reading side top up. The bulb reacts to temperature. It changes the amount of gas (increase or decrease), burning warmer or cooler depending on the position of the valve SET POINT. If the bulb is cooler than it was at the SET POINT, the bulb senses the cooler temperature and opens the valve further so more heat is applied to the drying air. If the bulb is warmer than it was at the SET POINT, the valve closes further and reduces the temperature until the air is at the valve SET POINT.

3 It is important that the pressure regulator be set high enough to allow the modulating valve to deliver enough gas to maintain the plenum temperature necessary. The regulator is normally factory set at 15 psi. To set the regulator, run the heater and turn the modulating valve T-handle in. This gets full line pressure to the burner. Then adjust regulator to read 15 psi (depending on the plenum temperature needed).

4 Turn the fan and heater on. To set the modulating valve, turn the T-handle out (counterclockwise) until loose and wait a few minutes for the plenum temperature to equalize. When the temperature under the bin has equalized, gradually turn T-handle in (clockwise) about 1/2 turn. Wait until temperature under bin has equalized as before. If temperature under bin is less than the desired temperature, continue turning T-handle in, increasing gas flow and waiting for plenum temperature to equalize until the desired temperature is the stable temperature of the plenum. If temperature under bin is the same 10 minutes after you last made any adjustments to the T-handle you can be certain that the temperature under the bin is the SET POINT of the valve. **1 turn of the T-handle equals approximately 7 degrees F of temperature.**

5 The valve will now keep the plenum temperature at the set point regardless of ambient conditions as long as humidistat or thermostat do not shut down the heater. A bypass orifice is used to maintain a small flame when outside temperature is near or above the set point of the valve. The bypass insures steady application of heat at minimum gas flow operation.

6 The modulating valve may require minor adjustment periodically if a certain temperature rise over ambient (outside) temperature is desired.

7 To observe how the modulating valve increases the efficiency of bin drying, check the gas pressure of the unit in the morning and compare to the pressure read mid-afternoon. If the ambient (outside) temperature is significantly greater later in the day (as normal), the gas pressure will be less. Since less heat is required to maintain the same temperature in the plenum, the modulating valve will have reduced the amount of gas used by the heater. This is preferred to cycling the application of heat as is commonly done. The grain is not shocked and cooled quickly and then reheated, which is a waste of fuel in conventional bin drying systems.

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The following tables are general values for equilibrium moisture content. The equilibrium moisture content is the moisture content that the grain will eventually arrive at if exposed to specific air conditions for a long enough period of time. The equilibrium moisture content does not tell us how fast the grain will lose moisture to get to its equilibrium moisture content. Generally, drying air conditions with a lower equilibrium moisture content are used to increase the rate of moisture removal. The drying process is then stopped before the grain can reach equilibrium with the drying air. The following tables should only be used as a guide for management of grain conditioning systems, possible deviations may occur due to varieties and grain condition. (Values calculated from the Henderson-Thompson equation.)

EQUILIBRIUM MOISTURE TABLE FOR SHELLED CORN % WET BASIS

Temp.	Relative Humidity (percent)								
degrees	10	20	30	40	50	60	70	80	90
35	5.2	7.6	9.5	11.3	13.0	14.8	16.8	19.1	22.2
40	5.0	7.4	9.3	11.0	12.7	14.5	16.4	18.7	21.7
45	4.9	7.2	9.0	10.8	12.4	14.2	16.0	18.3	21.3
50	4.8	7.0	8.8	10.5	12.2	13.9	15.7	17.9	20.9
55	4.7	6.9	8.8	10.3	11.9	13.6	15.4	17.5	20.5
60	4.6	6.7	8.5	10.1	11.7	13.3	15.1	17.2	20.1
65	4.5	6.6	8.3	9.9	11.4	13.0	14.8	16.9	19.7
70	4.4	6.4	8.1	9.7	11.2	12.8	14.5	16.6	19.4
75	4.3	6.3	8.0	9.5	11.0	12.6	14.3	16.3	19.1
80	4.2	6.2	7.8	9.3	10.8	12.4	14.0	16.0	18.8
85	4.2	6.1	7.7	9.2	10.6	12.1	13.8	15.8	18.5
90	4.1	6.0	7.8	9.0	10.5	12.0	13.6	15.5	18.2
95	4.0	5.9	7.4	8.9	10.3	11.8	13.4	15.3	17.9
100	3.9	5.8	7.3	8.7	10.1	11.6	13.2	15.1	17.7

EQUILIBRIUM MOISTURE TABLE FOR ROUGH RICE % WET BASIS

Temp.	Relative Humidity (percent)								
degrees	10	20	30	40	50	60	70	80	90
35	6.3	8.3	9.9	11.3	12.6	13.9	15.3	16.9	19.1
40	6.1	8.2	9.7	11.1	12.4	13.7	15.1	16.6	18.8
45	6.0	8.0	9.8	10.9	12.2	13.4	14.8	16.4	18.5
50	5.9	7.9	9.4	10.7	12.0	13.2	14.6	16.1	18.2
55	5.8	7.7	9.2	10.5	11.8	13.0	14.3	15.9	17.9
60	5.7	7.6	9.1	10.4	11.6	12.8	14.1	15.6	17.7
65	5.6	7.5	9.0	10.2	11.4	12.6	13.9	15.4	17.4
70	5.6	7.4	8.8	10.1	11.3	12.5	13.7	15.2	17.2
75	5.5	7.3	8.7	9.9	11.1	12.3	13.5	15.0	17.0
80	5.4	7.2	8.8	9.8	11.0	12.1	13.4	14.8	16.8
85	5.3	7.1	8.5	9.7	10.8	12.0	13.2	14.6	16.6
90	5.3	7.0	8.4	9.6	10.7	11.8	13.1	14.5	16.4
95	5.2	6.9	8.3	9.4	10.6	11.7	12.9	14.3	16.2
100	5.1	6.8	8.2	9.3	10.4	11.6	12.8	14.1	16.0

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EQUILIBRIUM MOISTURE TABLE FOR SORGHUM % WET BASIS

Temp. degrees	Relative Humidity (percent) 10	20	30	40	50	60	70	80	90
35	6.2	8.2	9.8	11.1	12.4	13.7	15.0	16.6	18.7
40	6.1	8.1	9.7	11.0	12.3	13.5	14.9	16.4	18.5
45	6.1	8.1	9.6	10.9	12.2	13.4	14.8	16.3	18.4
50	6.0	8.0	9.5	10.8	12.1	13.3	14.7	16.2	18.2
55	6.0	7.9	9.4	10.7	12.0	13.2	14.5	16.1	18.1
60	5.9	7.9	9.4	10.7	11.9	13.1	14.4	15.9	18.0
65	5.9	7.8	9.3	10.6	11.8	13.0	14.3	15.8	17.9
70	5.8	7.7	9.2	10.5	11.7	12.9	14.2	15.7	17.7
75	5.8	7.7	9.1	10.4	11.6	12.8	14.1	15.6	17.6
80	5.7	7.6	9.1	10.3	11.5	12.8	14.0	15.5	17.5
85	5.7	7.6	9.0	10.3	11.5	12.7	13.9	15.4	17.4
90	5.7	7.5	8.9	10.2	11.4	12.6	13.8	15.3	17.3
95	5.6	7.5	8.9	10.1	11.3	12.5	13.8	15.2	17.2
100	5.6	7.4	8.8	10.1	11.2	12.4	13.7	15.1	17.1

EQUILIBRIUM MOISTURE TABLE FOR SOYBEANS % WET BASIS

Temp. degrees	Relative Humidity (percent) 10	20	30	40	50	60	70	80	90
35	3.0	5.1	7.1	9.0	11.0	13.2	15.6	18.7	23.0
40	2.9	4.9	6.8	8.6	10.6	12.7	15.1	18.0	22.2
45	2.8	4.7	6.5	8.3	10.2	12.2	14.5	17.4	21.5
50	2.7	4.5	6.3	8.0	9.8	11.8	14.1	16.8	20.8
55	2.6	4.4	6.1	7.7	9.5	11.4	13.6	16.3	20.2
60	2.5	4.2	5.9	7.5	9.2	11.1	13.2	15.8	19.7
65	2.4	4.1	5.7	7.3	8.9	10.7	12.8	15.4	19.1
70	2.3	4.0	5.5	7.0	8.7	10.4	12.5	15.0	18.6
75	2.3	3.8	5.3	6.8	8.4	10.1	12.1	14.6	18.2
80	2.2	3.7	5.2	6.7	8.2	9.9	11.8	14.2	17.7
85	2.1	3.6	5.1	6.5	8.0	9.6	11.5	13.9	17.3
90	2.1	3.5	4.9	6.3	7.8	9.4	11.2	13.5	16.9
95	2.0	3.5	4.8	6.2	7.6	9.2	11.0	13.2	16.5
100	2.0	3.4	4.7	6.0	7.4	8.9	10.7	12.9	16.2

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EQUILIBRIUM MOISTURE TABLE FOR WHEAT (SOFT) % WET BASIS

Temp. degrees	Relative Humidity (percent) 10	20	30	40	50	60	70	80	90
35	6.3	8.3	9.8	11.1	12.3	13.5	14.8	16.3	18.3
40	6.2	8.1	9.6	10.9	12.1	13.3	14.6	16.1	18.1
45	6.1	8.0	9.5	10.8	12.0	13.2	14.4	15.9	17.9
50	6.0	7.9	9.4	10.6	11.8	13.0	14.2	15.7	17.6
55	5.9	7.8	9.2	10.5	11.7	12.8	14.1	15.5	17.4
60	5.9	7.7	9.1	10.4	11.5	12.7	13.9	15.3	17.2
65	5.8	7.6	9.0	10.2	11.4	12.5	13.7	15.2	17.0
70	5.7	7.5	8.9	10.1	11.3	12.4	13.6	15.0	16.9
75	5.7	7.4	8.8	10.0	11.1	12.3	13.4	14.8	16.7
80	5.6	7.4	8.7	9.9	11.0	12.1	13.3	14.7	16.5
85	5.5	7.3	8.6	9.8	10.9	12.0	13.2	14.5	16.4
90	5.5	7.2	8.5	9.7	10.8	11.9	13.0	14.4	16.2
95	5.4	7.1	8.4	9.6	10.7	11.8	12.9	14.3	16.1
100	5.4	7.1	8.4	9.5	10.6	11.7	12.8	14.1	15.9

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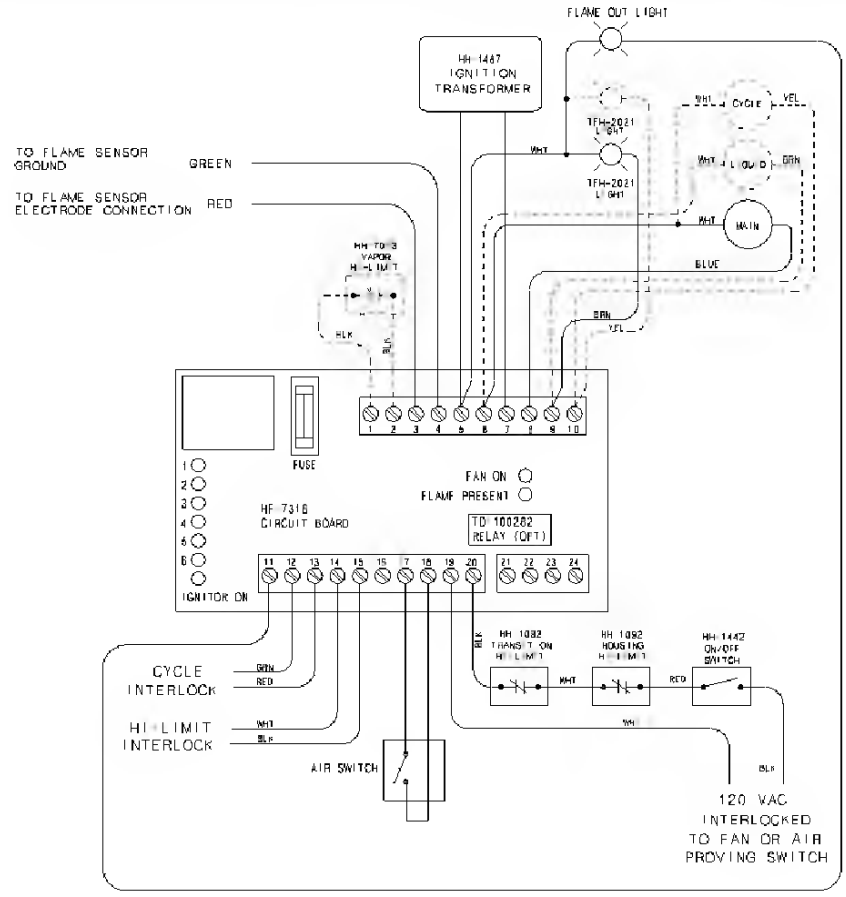
LTD HEATER WIRING DIAGRAM



● INDICATES LIGHT ON ○ INDICATES LIGHT OFF

INDICATION	POSSIBLE CAUSE	POSSIBLE SOLUTION
○ ○ ○ ○ ○ ○ 1 2 3 4 5 6	Bad On/Off Switch	Replace Switch
	Heater Housing Hi-Limit	Reset Or Replace Hi-Limit
	Transition Hi-Limit	Reset Or Replace Hi-Limit
	No Power To Heater	Check Heater
● ○ ○ ○ ○ ○ 1 2 3 4 5 6	Blown Fuse	Replace Fuse
● ● ○ ○ ○ ○ 1 2 3 4 5 6	Flame Sensor (if flame present light on)	Clean Or Replace Flame Sensor
	Control Board	Replace Control Board
	Air Switch (if fan on light not on)	Check Air Switch
● ● ● ○ ○ ○ 1 2 3 4 5 6	Vaporizor Hi-Limit	Adjust Vaporizor Coil Replace Vapor Hi-Limit
● ● ● ● ○ ○ 1 2 3 4 5 6	Humidistat/Thermostat	Temperature Reached Replace Thermostat Or Humidistat
● ● ● ● ● ○ 1 2 3 4 5 6	Spark Plug	Clean Or Replace Spark Plug
	No Fuel To Burner	Check Fuel Supply
	Bad Solenoid	Replace Solenoid

● ● ● ● ● ○ 1 2 3 4 5 6 **WAIT FOR 20 SECOND PURGE DELAY TO TROUBLESHOOT! INDICATING LIGHTS SHOWN ON LEFT SHOULD BE LIT WHEN UNIT IS OPERATING PROPERLY**

DC-1161

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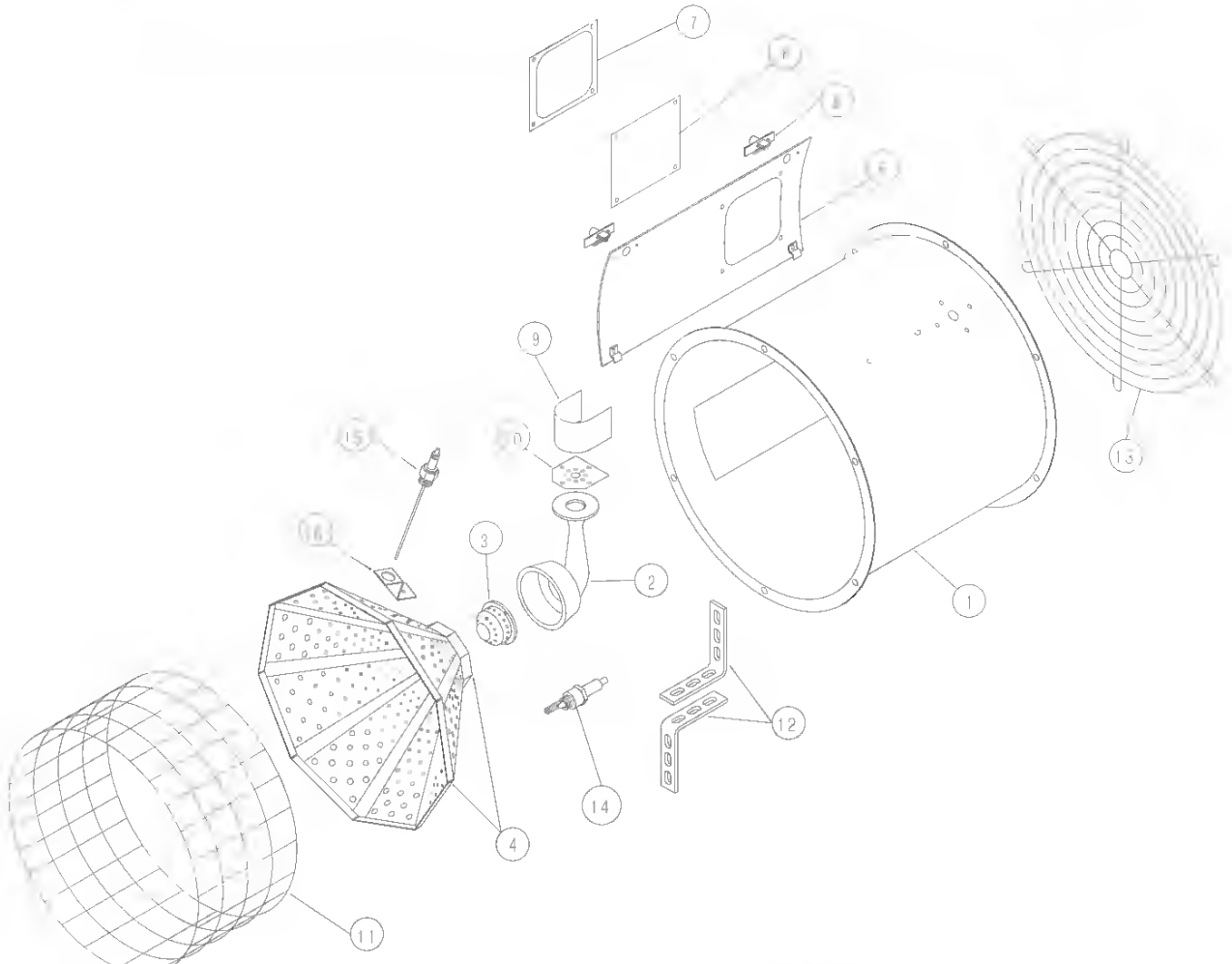
LTD HEATER PARTS

18" GAS HEATER



Key	Part Number	Description
1	HF-6785	18" Heater Housing
2	HH-3933	18" Burner Casting
3	HH-4410	18" Lo-Temp Flame Spreader
4	HF-7073	18" Lo-Temp Flame Diverter
5	HF-6062-18	18" Access Panel
6	HF-7380	Plastic View Window
7	HF-7379	Access Panel Cover Plate
8	TFH-2046	Access Panel Latch
9	HF-983	18/24" Burner Collector
10	HF-978	18/24/26" Burner Collector Plate
11	HH-4416	Drum Grill Guard (LTD)
12	HH-4421	Stand-Off Bracket (LTD)
13	F-953	18" Grill Guard (LTD)
14	HH-1650	Spark Plug
NS	HF-1810	Spark Plug Nut
NS	HF-7260	18-28" Heater Spark Plug Wire
NS	HF-7262	18-28" Heater Flame Probe Wire
15	THH-4179	Flame Sensor
16	CD-0187	Flame Sensor Bracket

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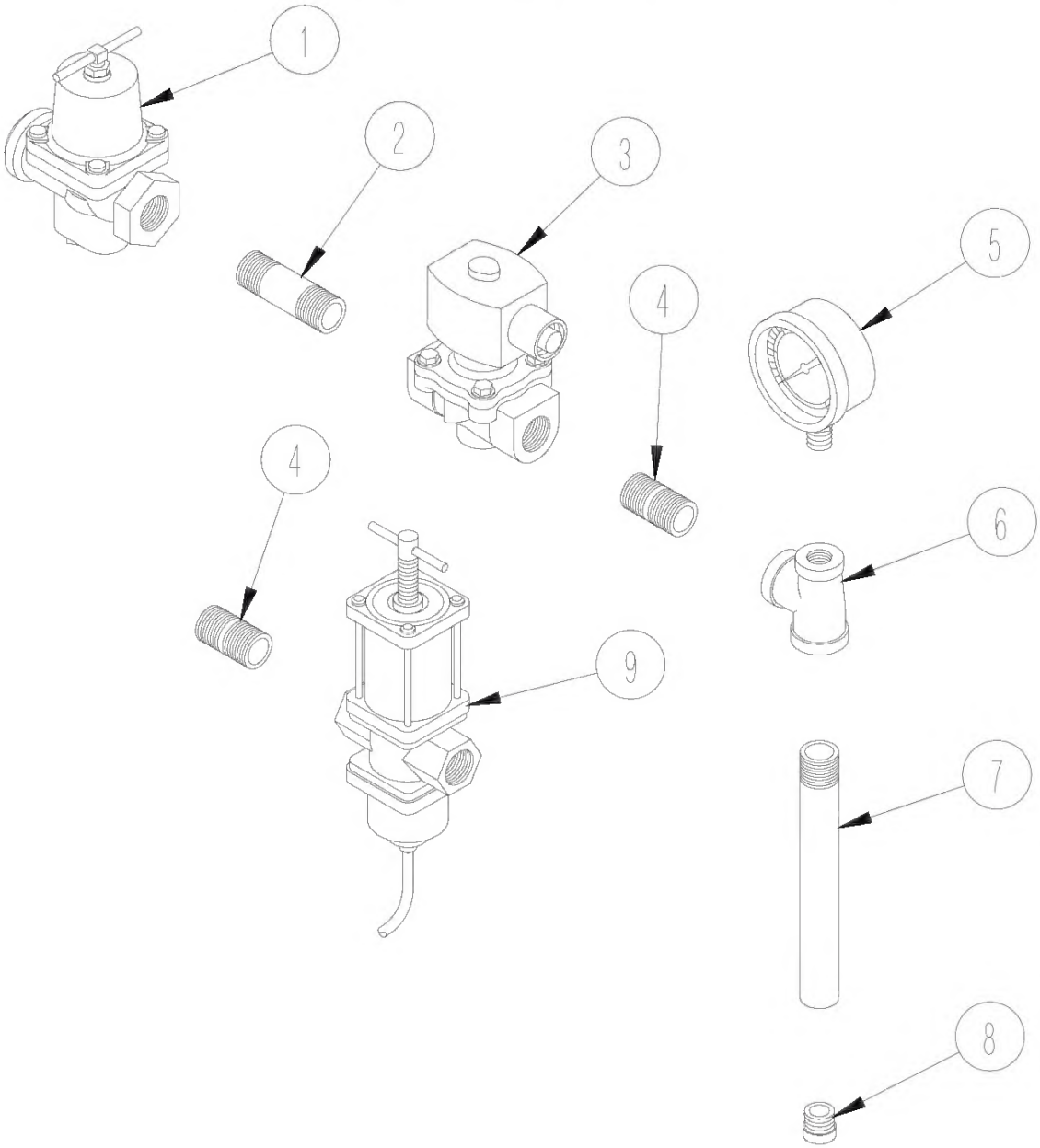
LTD HEATER PARTS

AXIAL PROPANE VAPOR & NATURAL GAS PIPETRAIN



Key	Part Number	Description
1	HH-1077	1/2" regulator
2	HH-3670	1/2" x 2-1/2" nipple
3	TFC-0032	1/2" solenoid
4	HH-2029	1/2" x 1-1/2" nipple
5	HH-2984	1/4" gauge 30PSI
6	S-3853	1/2" x 1/4" x 1/2" tee
7	HH-1083	18/24/28" Orifice pipe
8	CD-0149	5/64" Orifice plug (propane)
8	HF-7085	9/64" Orifice plug (natural gas)
9	HH-2653	Modulating valve

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CONTROL BOX PARTS

Key	Part Number	Description
1	F-942	Control Box Lid
2	HH-1487	Ignition Transformer
3	HF-7318	Deluxe Control Board
4	HH-1092	Housing Hi-Limit
5	FH-4429-1	Latch
6	HF-7211	Snap Track
7	HF-7046	18" Control Box Housing
8	DC-1166	Control Box Decal
9	TFH-2021	110V Red Light
10	HH-1442	Toggle Switch

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